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Heleodytes zonatus restrictus, new subspecies. TABASCO WREN.

No. 166,601, ♂ ad., U. S. National Museum, Biological Survey Collection. From Frontera, Tabasco, Mexico, collected April 26, 1900, by E. W. Nelson and E. A. Goldman.

Distribution. — Wooded coast plains of Tabasco.

Subspecific characters. — Differs from typical *H. zonatus* (from mountain slopes of Vera Cruz) mainly in much heavier and transversely broader black spotting on under side of neck and breast; rest of lower parts much more dingy buff, heavily barred and spotted on sides and flanks with black; back more like that of *zonatus* but with little or no traces of rusty buff suffusion.

Dimensions of type. — Wing, 92; tail, 95; culmen, 24; tarsus, 29.

Notes. — The very heavy black spotting and barring on the underparts with the dull dingy shade of buff on the crissum renders this form very readily distinguishable from typical *H. zonatus*. Its range appears to be restricted to the wooded coast lowlands while we found *H. zonatus* only on the wooded slopes of the cordillera in Vera Cruz and Tabasco. We obtained ten specimens of this new form at Frontera.

THE SEQUENCE OF MOULTS AND PLUMAGES OF THE LARIDÆ (GULLS AND TERNS).

BY JONATHAN DWIGHT, JR., M. D.

THE importance of the moulting of birds from the standpoint of the systematist becomes apparent if we stop to consider that each moult marks a point of transition from one plumage to another and is therefore a key to their relationship. It is, however, not far from the truth to say that the natural sequence of plumages and moults is but imperfectly understood in many species, while the times of year at which moults occur and the areas of feathers involved in partial moults, especially of young birds, are matters still offering a wide field for investigation.

The moulting of the Gulls and Terns has received little attention save at the hands of C. L. Brehm in 1854, although their plumage has been elaborately discussed by many writers, especially Saunders and Coues. It is my present purpose to point out as clearly as circumstances permit the relation that exists between the different stages of plumage and moult of these interesting birds. It would be far easier to do this if the age of the specimens in hand could be accurately known, but unfortunately there are limits to the physiological and osteological evidences of immaturity even in fresh birds, while dried skins tell us nothing of age unless they chance to show transition stages at a period of active moult. Such specimens in my own collection as I have studied while fresh have enabled me to follow details of moult obscured or completely lost in museum specimens, and I have had opportunity afforded me, through the courtesy of Dr. J. A. Allen, of examining the large series in the American Museum of Natural History. Mr. Wm. Brewster has also given me opportunity of examining his extensive collection, so that I have been able not only to trace successive stages of plumage in a large number of species of Gulls and Terns, chiefly North American, but in many cases I have found specimens in the midst of moult which fill the gaps between the stages. As a result of my studies I can confidently affirm that these birds conform to the same laws of plumage development that operate in other species. These I have so fully explained in a recent article (Annals N. Y. Acad. Sci., XIII, 1900, pp. 74–345, pll. vii), intended to be the first of a series but delayed in publication, that I need only refer to it. Among the Laridæ will be found the same definite sequence of plumages and moults as in other species. Adults wear a winter or autumnal and a nuptial, summer or breeding plumage separated by postnuptial and prenuptial moults, while young birds pass from the downy or natal plumage to the juvenal and first winter dresses by a postnatal and a postjuvenal moult respectively. The moults occur at definite periods, and the feather growth spreads from definite points in the feather tracts, so that nothing is a matter of chance unless it be the arrested development that befalls all organisms and occasions in birds the retention of old feathers among those that are replaced by new at the time of a partial moult. So it often happens that some plum-

ages are made up of parts of several earlier ones, a fact that has given rise, no doubt, to the old idea that a color change was in progress.

It may be well to briefly outline the order of renewal in the Laridæ although it does not differ materially from that of other groups of birds. The dorsal feathers at the root of the neck are apt to be the first to show renewal, but almost simultaneously new feathers begin to appear on the humeral tracts, on the anterior parts of the head, at the sides of the breast, on the flanks and at fresh points on the back, the new growth tending to spread backwards from these initial points with some indication of alternate feather replacement. New feathers begin to show along the cubital borders of the wings, and the proximal primary is lost early in the moult. The others fall in succession, the inner primaries more rapidly than the outer, and each gains nearly full length before the next is lost. When only three or four remain, the distal secondary succumbs to moult, followed rapidly by the others, so that the proximal is lost before the distal primary is fully grown. The growth of this primary marks very nearly the completion of the moult, although the rectrices are often a little later, the middle pair falling usually coincidently with the distal secondary, followed by adjacent pairs, except that the outer pair may precede the one adjacent and that almost the whole tail may be lost at once in some cases. The last feathers to be renewed may be found at many points, especially on the forehead, nape, interramal space, posterior parts of the body and in the median wing-coverts. If the moult be partial only the back, head and neck are affected, together with, perhaps, the cubital borders of the wings and the tertiaries, and sometimes apparently little more than the anterior part of the back succumbs. It is important to know the relative order in feather growth because partial moults, beginning at the same points as complete ones, extend somewhat irregularly for only a limited distance from them.

All of the species of Gulls and Terns appear to belong to the class of birds in which the adults moult twice every year. The Terns undergo two complete moults in a year and while the Gulls also undergo two, the prenuptial is incomplete and never includes the remiges and rectrices, or the wings and tail. Further than this, two groups of Gulls may be recognized, (1) the smaller species

with an extensive prenuptial moult, which acquire adult plumage at the first postnuptial, and (2) the larger species, with a more limited prenuptial, which acquire few if any signs of adult plumage until the second postnuptial change. The postnuptial moult, beginning directly after the breeding season, proceeds more rapidly than the prenuptial, which is rather a leisurely affair, beginning sometimes, especially in the case of the Gulls, as early as mid-winter. Young birds regularly by an incomplete postjuvenal moult pass into a first winter plumage which, among the Terns, is scarcely different from the adult winter dress; among the smaller Gulls it is recognizable in most species by black-banded tails and dusky cubital bands, the remains of juvenal dress, and among the larger Gulls it is of quite a different pattern and color from the mature plumage of adults. The postjuvenal moult seldom manifests itself before the end of September or much later, and in the larger species proceeds so leisurely that it sometimes appears to overlap the first prenuptial, beginning as early as February or March.

It is an interesting question whether young birds breed before their second summer. A considerable number of immature birds of different species are certainly found in summer south of their breeding range, but their numbers do not seem to warrant the conclusion that all young birds do not breed the first summer. It is more probable that they are the less vigorous individuals of the species. They have been credited with remaining in winter plumage, but this impression needs qualification, for I have examined, while fresh, eight specimens of the Arctic Tern (*Sterna paradisæa*), and three of the Kittiwake Gull (*Rissa tridactyla*), which show clearly evidences of a recent prenuptial moult, only instead of assuming nuptial dress they have reverted to the winter plumage. I secured these birds on Sable Island, Nova Scotia, between June 5 and 11, 1894, and dissection showed that they were neither breeding nor about to do so. The Terns were of course in the plumage once described as "*Sterna portlandica*," and were easily distinguishable among thousands of Common, Arctic and Roseate Terns already breeding, by their white foreheads, dusky cubital bands, short tails and black feet and bills. Attention was often drawn to them by their single harsh croak

seldom uttered as they circled among the clouds of Terns in the proportion of perhaps one to one thousand. The Kittiwakes were obtained from a small flock, and it is of interest that this species does not breed within several hundred miles of Sable Island. Birds of several other species in a similar first nuptial plumage have occasionally been taken, but their significance has not been understood. We may attribute the lateness of their prenuptial moult to lack of vigor, if we please, and it is possible some of the midsummer birds that we have supposed were adults passing by an early postnuptial moult to winter plumage are really immature birds, but for further light on this point we must look to field observers. As such birds assume in early summer a winter dress, it is possible that their moult is really a first postnuptial, no further feather change occurring for a year, but it seems more probable that a postnuptial moult takes place later when they assume for the third time in succession a plumage that is certainly of the winter type. The Kittiwakes cited, and some museum specimens of several other species, seem to point to a similar sequence among Gulls.

Much might be said upon the subject of wear, under which I include all the destructive results of abrasion and bleaching, but suffice it here to direct attention to a couple of points. One is the extremely marked fading of the buff edgings of plumages of young birds, especially the juvenal, in which the buff often becomes white; and the other is loss of the 'frosting' or 'silvering' on the wings of many species, which produces black primaries. The 'frosting' is due to elongated, curved and frilled barbules on the distal sides of the barbs, and when the barbules are worn off their black basal portion becomes conspicuous. As a rule the fourth primary of each wing appears to suffer most, the third, second and first or distal blackening later in the order indicated.

We may now take up in their natural sequence the plumages and moults of a Tern, of a small Gull and of a large Gull, the three chosen being typical of all the others, and I begin with the Tern, as the number of recognizable plumages are fewer owing to the complete double or semiannual moult.

The sexes among the Laridæ are fortunately alike in all plumages, only to the more salient features of which reference will be made

Sterna hirundo *Linn.* COMMON TERN.

1. *Natal Down.* — This covers the chicks thickly and is yellowish with black spots or mottling above and a dusky area on the chin and sides of the throat.

2. *Juvenal Plumage* acquired by a complete postnatal moult shortly after leaving the egg. Dusky markings and buff edgings are conspicuous above, the lower parts being a clear white. The forehead is pale brown blending into a dull black occiput. Buffs and browns later become dull white by fading and the blacks become brownish. The forking of the tail is much less than that of adults and the rectrices are more rounded, darker and tipped with dusky or buff markings, which become largely lost by wear. A couple of rows of lesser coverts along the cubital border of the wing form a dull black band. The flesh-colored bill and feet, after first brightening, begin to darken.

In Nova Scotia young birds are on the wing before the first of August but often not till considerably later, and the birds of the Virginia coast do not seem to be very much earlier. The misfortunes to eggs and broods must be held responsible for the extreme variations in the times of moult of this as well as other species of terns. Some, if not all terns, young as well as adults, migrate southward before beginning to moult, as is proved by specimens taken in juvenal and nuptial dress far south of their breeding grounds.

3. *First Winter Plumage* acquired by a partial postjuvenal moult, limited to the body feathers, and sometimes a few of the lesser wing-coverts. The new mantle is gray except for the dusky cubital bands. The forehead is white and the occiput black, with some tendency to streaking on the crown. The bill and feet become wholly black. Save for the less forked, darker tail and traces of buff on the retained wing-coverts, young birds closely resemble adults. The change to this plumage is not apt to begin before the end of September on the Atlantic coast.

4. *First Nuptial Plumage* acquired by a complete first prenuptial moult, which explains the freshness of all the feathers of breeding birds. The lateness of this moult in some birds is indicated by over fifty specimens (some of which appear to be

adults) taken in Florida between May 28 and June 3, which vary from birds with the first primary barely grown to those still retaining two or three of the old primaries and a number of old rectrices and body feathers. The black cap is now assumed, the dusky cubital bands disappear, and the bill and feet become chiefly coral red. The significance of certain birds which reassume the winter plumage has already been discussed.

5. *Second Winter Plumage* acquired by a complete first postnuptial moult, as a rule not earlier than September. This dress is hardly distinguishable from that of the first winter, and the bill and feet turn black before the moult is completed.

6. *Second Nuptial Plumage* acquired by a complete second prenuptial moult. The older birds are probably represented by the specimens with longer, more attenuated lateral rectrices which are paler than those of young birds, but it is difficult to say how much the slight differences are due to age, and how much to individual variations. Young and old are not distinguishable after the first prenuptial moult, and later plumages and moults are but repetitions of winter and nuptial changes.

What is true of sequence in *Sterna hirundo* is evidently true of all the North American Terns and probably of other species, of which I have seen but few specimens. Most species are black-capped in nuptial dress. *S. hirundo*, *S. paradisæa* and *S. dougalli* assume in winter white foreheads gradually blending into dull black occiputs; *S. maxima*, *S. elegans* and *S. sandwichensis acuflavida* have a distinctly black and white streaked crown between the white forehead and black occiput; *S. caspia* has the whole cap streaked with black and white, black predominating; *S. forsteri*, *S. antillarum*, *S. fuliginosa*, *S. anæstheta*, *Geochelidon nilotica* and *Hydrochelidon nigra surinamensis* have caps largely white anteriorly and gray posteriorly. The winter mantle appears to be regularly somewhat paler than the nuptial, strikingly so in the Black Tern. In this species the sootiness is foreshadowed even in the natal down, while the black and white mottling during the progress of moults is a very conspicuous feature. In *Anous stolidus* the winter dress differs from the nuptial chiefly on the crown, which is nearly as brown as the rest of the plumage, only a narrow white supraloal line remaining.

The period of the prenuptial moult on the Atlantic coast covers the months of February, March, April and May, large species like *S. maxima* and those with a southern breeding range moulting chiefly in the first two of these months and other species later. The postnuptial moult begins in July in some species and not till September in others. The postjuvenal moult seldom begins before the postnuptial and often not till October. The species are all so harassed on their breeding grounds that the natural season of moult is doubtless much extended when eggs or young are swept away by the elements or the equally ruthless hand of man.

I have examined the type specimen of "*Sterna pikei*" which has correctly been identified as *S. paradisæa*. The bird is apparently assuming winter dress with dusky cubital coverts, retaining only one primary of the old plumage. The broken bill seems to be in transition from the carmine nuptial to the black winter color. "*Sterna havelli*" is of course the winter plumage of *S. forsteri*, and such birds as are found in summer in this dress will probably prove to be non-breeding, like "*S. portlandica*."

To illustrate the plumages and moults of the smaller Gulls I might chose any one of several species of which I have seen full series. I have selected the following as a typical species.

Larus philadelphia (*Ord*). BONAPARTE'S GULL.

1. *Natal Down.*— Much like that of *Sterna hirundo*, yellowish with dusky mottling above.

2. *Juvenal Plumage* acquired by a complete postnatal moult. The upper surface is decidedly brown with paler edgings, a blackish brown band extends along the cubital border of the wing into the tertiaries, the secondaries have dusky markings, the primaries show little white, their coverts being partly black, and the tail is white with a broad subterminal black band, the rectrices being tipped with buff. The sides of the head are white with a dull black auricular patch and an anteorbital spot, and the rest of the lower parts are white with a brownish wash on the sides of the neck and breast. The bill and feet are black.

3. *First Winter Plumage*, acquired by a partial postjuvenal moult late in September and October which involves only the body

feathers, just as in *S. hirundo*. A blue-gray mantle and paler head are assumed, the retained wing markings and banded tail of the juvenal dress characterizing young birds until their first postnuptial moult.

4. *First Nuptial Plumage*, acquired by a partial first prenuptial moult during March and April on the Atlantic coast. Much of the body plumage is renewed, the mantle and lower parts resembling the winter dress, while the deep plumbeous hood is partly, and probably in many birds fully acquired. I have examined early May specimens from New York which still show new growth of feathers at the usual points. Some specimens appear to reassume the winter dress, or merely a dusky somewhat mottled head, analogous to the change in "*Sterna portlandica*."

5. *Second Winter Plumage* acquired by a complete first postnuptial moult, beginning about the middle of July in New York and fully a month earlier in California. Maine specimens show the beginning of the moult early in August. It is doubtful whether birds that appear on our coasts very early have been breeding birds, and the same question may be raised in regard to other species. At this moult birds assume adult characters, a wholly gray mantle, a white tail, and primaries showing large white areas extending to the outer webs, obvious even with the wings closed.

6. *Second Nuptial Plumage* assumed by a partial second prenuptial moult at which the full dark hood replaces the grayish white one outlined on the winter dress. It is unnecessary to trace later plumages, which resolve themselves into successive adult winter and adult nuptial dresses.

Species that moult precisely like *L. philadelphia* are *L. atricilla*, *L. franklinii*, *L. ridibundus*, *Rodostethia rosea*, *Xema sabinii* and *Rissa tridactyla*. All of these I have examined and find that the dark-banded juvenal tail and wings are retained until the first postnuptial moult when young and old become practically indistinguishable. The bill in several species reddens or becomes yellow in summer, changing to black or plumbeous in winter. The adult postnuptial moult is seldom completed before October in any of these species, and the postjuvenal often occurs still later. *Rissa tridactyla* is peculiar in assuming a juvenal mantle that is gray without distinct edgings, and the first winter mantle is

also gray, the black nuchal patch usually being obliterated by new feathers. The claim of a color-change without moult in *Larus ridibundus* is not substantiated by a series of specimens taken throughout the year. In first winter plumage there is a brownish crown patch and occipital band concealed by white or gray feather tips, much as in *L. philadelphia*, and as these wear off the brown comes more into view, but at the same time new darker brown feathers grow. A specimen in the midst of a second (or later) prenuptial moult (Amer. Museum No. 54632, ♀, March 6, England) shows new growing feathers not only on the head but elsewhere; the forehead anteriorly still retains the worn white plumage of the winter dress. Another bird (Amer. Museum No. 26977, ♀, March 25, France) has acquired the full brown hood of new feathers, some of them still pushing out from their sheaths. If such feathers were recolored how is their perfect structure to be explained?

We come now to a third type of moult which is peculiar to all of the larger Gulls, and I have chosen as a representative species

Larus argentatus *Brünn.* HERRING GULL.

1. *Natal Down.* — Grayish above with obscure mottling on the back and black spots on the head and throat, paler below.

2. *Juvenal Plumage* acquired by a complete postnatal moult. Above grayish brown with whitish and buffy edgings; below plumbeous with inconspicuous whitish mottling, the head and neck paler and tending to streaking. The primaries are uniformly brownish black. The rectrices are similar but basally, and the outer one slightly, mottled with grayish white. The bill is plumbeous and the feet flesh-colored.

3. *First Winter Plumage* acquired by a limited postjuvenal moult which is apparently either suppressed in some individuals or postponed till the prenuptial period. The worn and faded juvenal dress is replaced on the back, head, and sides of breast by a similar plumage, which, however, is somewhat grayer and more mottled. November specimens are most apt to show this growth, which is very gradual and easily overlooked.

4. *First Nuptial Plumage* acquired by a limited first prenuptial moult in March, the renewal being over the same areas affected by the postjuvenal. It is extremely difficult to obtain enough specimens to show the limits of these two moults, which may possibly represent but one. It may be that some birds moult either at one period or the other and not at both, but at all events moulting birds may be found both in spring and fall. Mottled brown feathers and rarely gray ones are assumed at both times and it seems proper to recognize two moults analogous to those occurring in adults. Specimens have been reported as breeding in juvenal dress, but it is possible such birds have been in either first or second nuptial plumages.

5. *Second Winter Plumage* acquired by a complete postnuptial moult, chiefly in August on the Atlantic coast. An immature dress is assumed, the mantle being largely pearl gray but mixed with mottled brownish feathers, especially on the wing-coverts. The lower parts are largely white but much clouded with dusky edgings. The white head, neck and rump are heavily streaked. The tail is white heavily sprinkled centrally with dusky brown. The secondaries are similarly mottled. The primaries are dull black, sometimes with small white apical spots, the first usually with traces of a subapical spot, sometimes with none. The amount of individual variation seems to be within reasonable limits, the average of which I have here indicated.

6. *Second Nuptial Plumage* acquired by a limited second prenuptial moult in March or April, the back getting new gray feathers and the head and neck becoming white clouded a little with brownish gray. The bill becomes yellow. These birds unless closely examined would pass for adults.

7. *Third Winter Plumage* acquired by a complete second postnuptial moult. A mantle wholly pearl gray is now assumed, the lower parts and the tail becoming pure white. The customary winter streaking of the head and neck is reduced. The primaries are tipped with white, the first having a large white subapical spot, and the second sometimes shows signs of one. The moult is at its height about the first of September.

8. *Third Nuptial Plumage* acquired by a limited third prenuptial moult, at its height in March. A pure white head, neck and breast

and a gray back are acquired. The feet in adults remain flesh-colored.

9. *Fourth Winter Plumage* acquired by a complete third postnuptial moult. This is practically like the third winter or later winter plumages, and although the age of birds after the second postnuptial moult can only be inferred from their plumage, it is probable that the white spots of the primaries, especially of the first, increase with age. The size of the bill and the whiteness of the head in winter also increase. As a progressive increase in these matters can be demonstrated at the time of three moults, it is logical to assume, within certain limits, a continued increase, and so in older birds we would expect a fusion of the two terminal areas of white on the first primary. The presence of a divided white area is the chief character on which the American subspecies *smithsonianus* rests, and unless differences from the European birds can be found in all of the stages of plumage just indicated the separation rests on a very slender basis. Is the European bird always marked by one white area? It is not difficult to pick out a series of American birds showing all gradations from a first primary with a small white spot to one that ends in a broad dash of white, and I believe that the scarcity of the whiter-tipped specimens is due rather to the diminishing numbers of older birds and their increasing wariness than to the straggling to America of Old World birds.

The question of age has not been sufficiently taken into account by the systematists who have attached undue importance to the spots and spaces of white and gray found on the wings of gulls. There is no question but that there is a progressive increase, with age, of white or gray areas in many species. The white spot of the first primary grows larger in a number of species at successive moults, and in many of the species the blackness of the feather shaft through it is gradually lost. The size and proportions of the bill also vary with age, while its color varies both with age and with season, being dark in winter and usually yellow in summer. These matters should be weighed in studying the affinities of the gulls. The larger ones may be conveniently divided into three classes: those with black primaries, those with white, and those with gray. In all three the sequence of plumages and moults

is nearly identical with that of *Larus argentatus*, as I have determined by series of birds of several species taken at important transition points of the moults.

Of the first class, in juvenal plumage the primaries are wholly dull black with a similar tail, the body feathers being more or less gray or brown, the darkest species of those examined being *L. heermanni*, with *L. marinus*, *L. occidentalis*, *L. californicus* and *L. argentatus* somewhat lighter. *L. delawarensis*, *L. canus* and *L. brachyrhynchus* are similar in plumage except for their banded tails, the first species differing from all the others in its dusky spotted body plumage. At the postjuvenal and first prenuptial moults the faded dress is partly exchanged for one less brown, the smaller species apparently sometimes assuming a few bluish gray feathers on the back. At the first postnuptial moult, the black primaries and tail are reassumed, and in those species which, when adult, have spotted primaries, there is often the suggestion of a white spot on the first primary. The new tail is speckled with gray, being white basally and laterally; in banded species the band becomes narrower but does not disappear as is usual in gulls of the type of *L. philadelphia*. The body plumage acquired is largely white, veiled with brown, except that the gray mantle, mixed with speckled feathers, is now apparent. *S. heermanni* remains wholly dark. Birds pass their second winter in this plumage, which varies in the proportion of adult characters according to the individual. The second prenuptial moult adds to the grayness of the mantle and to the whiteness of the head and lower parts, and birds would pass for adults were it not for the wings and tails. When these are again renewed at the second postnuptial moult the first primary shows a spot and the rectrices become wholly white or with but a touch of darker color. Later than this we can scarcely follow differences of plumage. The nuptial and the winter mantles hardly differ, and the brown streaking of the head in winter appears to diminish with age, while the areas of white on the wings apparently increase, as well as the proportions of the whole bird.

The gulls which have white primaries when adult, *viz.*, *L. glaucus*, *L. barrovianus* and *L. leucopterus*, do not in juvenal plumage differ very much from *L. argentatus*, being of a uniform

deep gray color with buffy edgings. They are paler, however, and the primaries are deep gray instead of black. The limited moults of the body feathers during the winter, together with fading, effect a slight paling. At the first postnuptial moult pale brown, sometimes partly mottled remiges and rectrices are acquired and a similar brown variegated body plumage. The primaries are very nearly white. A specimen of *L. glaucus* (Amer. Mus. No. 64144, September 1, Greenland) in fresh plumage, still showing the sheaths of the first primary and several rectrices, seems to prove that the brown mottled dress is a second winter plumage, and not a first as generally supposed. This is the plumage that later, at the second prenuptial moult, acquires a sprinkling of pearl gray feathers. Not till the second postnuptial moult are the white primaries and partly pearl gray mantle assumed. This seems to be the sequence of these plumages, as well as may be judged from material that gives only slight clues as to age. We may suppose the absolutely white "*Larus hutchinsii*" to be an extremely adult *glaucus* similar to occasional nearly pure white specimens of *leucopterus*. There is at all events nothing about such birds, which are rare, to suggest immaturity.

We come lastly to consider the gulls with gray-patterned primaries, which include *L. glaucescens*, *L. kumlieni* and *L. nelsoni*. In juvenal plumage *glaucescens* is only a trifle darker than *glaucus*, though distinguishable by size, and like it appears to assume a similar first winter and first nuptial dress by limited renewal of body feathers. At the first postnuptial moult a similar brown mottled dress seems to be assumed with pale primaries while part of the gray mantle and a white head are added at the second prenuptial moult. The first gray-patterned primaries and white tail are apparently not acquired until the second postnuptial moult, together with the first adult plumage. There is of course possibility of error in examining series, large or small, and it may be that the mottled specimens of both *glaucus* and *glaucescens* are exceptions, while the majority of the birds acquire a more adult plumage at the first postnuptial moult, as does *argentatus*, *occidentalis*, etc. Do we know I may ask, how great is the proportion of immature birds of the former two species as compared with the latter?

Without the examination of further material I cannot determine definitely the status of *kumlieni* and *nelsoni*, but I am of opinion that the former is a plumage of *leucopterus* after the second postnuptial moult, and the latter is possibly a similar stage of *glaucescens*. This question and many others present themselves as we learn what bearing age has in modifying plumage and proportions of the Gulls. I think the specific distinctness of *L. barrovianus* from *glaucus* is open to doubt, and *brachyhynchus* is likely to prove merely a variety of *canus*, while *L. schistisagus*, *L. affinis*, *L. cachinnans* and *L. vegæ*, on further study, may perhaps show new affinities.

My sketch of the sequence of moults and plumages of the Gulls and Terns has necessarily been superficial in many respects, but at least we have gained enough insight into the usual course of their changes of plumage to see that plumages are definite entities acquired along definite lines of development. It seems to me that, with all the material available for study at the present day, we should avoid classing together, as in the past, unrelated stages of " immature " plumage and specify precisely what stage we mean unless we wish to subject ourselves to the lurking suspicion that our knowledge or our methods have not kept pace with our scientific zeal.

EIGHTEENTH CONGRESS OF THE AMERICAN ORNITHOLOGISTS' UNION.

THE EIGHTEENTH CONGRESS of the American Ornithologists' Union convened in Cambridge, Mass., Monday evening, November 12, 1900. The business meeting was held in Mr. William Brewster's museum, and the public sessions, commencing Tuesday, November 13, and lasting three days, were held in the Nash Lecture-room of the University Museum.

BUSINESS SESSION.— The meeting was called to order by Vice-President Merriam, in the absence of the President, Mr. Robert